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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/599,141	06/22/2000	Bin Yu	39153/256 (FO113)	7361

7590 10/24/2002

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EXAMINER
ROMAN, ANGEL

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 10/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/599,141	Applicant(s) YU, BIN	
	Examiner Angel Roman	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24,27 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24, 27 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6 and 7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The declaration filed on 08/06/02 under 37 CFR 1.131 is sufficient to overcome the Ouyang et al. reference.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3 and 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sameshima et al. U.S. Patent 5,591,653.

Sameshima et al. discloses a method of manufacturing an integrated circuit, comprising; providing an amorphous semiconductor material 3 including germanium (see Abstract) above a bulk substrate 1; laser annealing the amorphous semiconductor material (see column 2, lines 53-60) to form a single crystalline semiconductor layer 4 containing germanium; and doping the single crystalline semiconductor layer and the substrate at a source location and a drain location (see column 4, lines 14-20) to form a source region 8a and a drain region 8b, whereby a channel region between the source region and the drain region includes a thin semiconductor germanium region (see Abstract). Sameshima et al. also discloses providing a cap layer 6 before the doping

step. A gate structure 9 is provided after the cap layer 6. The bulk substrate is made of glass or the like (see column 3, lines 65-67 and column 4, lines 1-2.

Sameshima et al. is applied as above but lack anticipation on using a semiconductor substrate as the bulk substrate. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to use a single crystal silicon semiconductor as a bulk substrate in the primary reference of Sameshima et al. since single crystal silicon bulk substrates are conventionally used as bulk substrates in thin film transistor manufacturing processes.

4. Claims 1-24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burghartz et al. U.S. Patent 5,461,250 in view of Sameshima et al. U.S. Patent 5,591,653.

Burghartz et al. discloses a process of forming a transistor with a silicon germanium channel region, the process comprising; depositing a thin amorphous silicon germanium material above a top surface of a single crystalline semiconductor substrate 106 (see column 9, lines 1-14) forming a single crystalline silicon germanium material 102; depositing a thin silicon material (cap layer) above the single crystalline silicon germanium material 102 forming a single crystalline silicon material 104; and providing a source region 116 and a drain region 118 for the transistor, the source region and the drain region extending into the substrate (see figure 1); providing an oxide layer 112 above the silicon material 104. Burghartz et al. also discloses forming silicide layers on the source and drain regions (see figure 4). A gate structure 108 is provided between

the source and drain location (see figure 1). The cap layer is annealed before the doping step (see figure 4).

Burghartz et al. is applied as above but lacks anticipation on using an excimer laser with a 308 nanometers wavelength to recrystallize the amorphous layers; disclosing layer thickness between of 100-150 Å for the silicon material and 200-500 Å for the silicon germanium material; and disclosing annealing temperatures between 1100-1400 degrees Celsius.

With respect to using an excimer laser with a 308 nanometers wavelength to recrystallize the amorphous layers, Sameshima et al. discloses forming an amorphous layer on a silicon substrate and recrystallizing the amorphous layer by laser annealing with a 308 nanometers wavelength to form a single crystalline layer. In view of this disclosure, it would have been obvious to a person having ordinary skills in the art at the time the invention was made to recrystallize the amorphous layers in the primary reference of Burghartz et al. by using an excimer laser with a 308 nanometers wavelength as disclosed in Sameshima et al. since this is a conventional process used to form single crystalline layers. Furthermore, optimizing the process disclosed by Burghartz et al. by using a well-known method of forming single crystalline layers is only considered to be routine optimization of the process disclosed by Burghartz et al. since in step 410 of figure 4 recrystallization of the layers is suggested.

Regarding the thickness values for the single crystalline layers, layer thickness between of 100-150 Å for the silicon material and 200-500 Å for the silicon germanium material are only considered to be "optimum" thickness values and a person having

ordinary skills in the art at the time the invention was made would have been able to determine them by performing routine experimentation.

As to disclosing annealing temperatures between 1100-1400 degrees Celsius, selecting an temperature parameter between 1100-1400 degrees Celsius in the primary reference of Burghartz is only considered to be a prefer temperature range that a person having ordinary skills in the art at the time the invention was made would have been able to determine by performing routine experimentation and process optimization by selecting a desire parameter of annealing recrystallization temperatures.

Response to Arguments

5. Applicant's arguments with respect to claims 1-24, 27 and 28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamazaki et al., Weiner, Yu and Chu et al. disclose methods of manufacturing semiconductor devices containing germanium.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

8. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angel Roman whose telephone number is (703) 306-0207. The examiner can normally be reached on Monday-Friday 8:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

John F. Niebling
Supervisory Patent Examiner
Technology Center 2800

AR
October 21, 2002